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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/880,798	06/15/2001	Avetik R. Harutyunyan	59516-013	6676

7590 02/07/2003

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EXAMINER

LISH, PETER J

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 02/07/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

AS7

Office Action Summary

Application No.

09/880,798

Applicant(s)

HARUTYUNYAN ET AL.

Examiner

Peter J Lish

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-15 and 17-20 is/are rejected.
- 7) ☒ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3-4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claims 1-9 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 6. The traversal is not persuasive as there is a burden of search, and each group has separate issues to consider when evaluating the claims.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase "re-seeding the catalyst bed" is unclear. There is no previous mention of "seeding a catalyst bed" and therefore it is unclear as to what "re-seeding the catalyst bed" is drawn. Is the catalyst bed to mean a substrate and "seeding the bed" to mean attaching the metal catalyst to the substrate?

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10-15 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Resasco et al. (USPN 6,333,016) in view of Xu et al. (USPN 5,973,444).

Resasco et al. teach a method for the manufacture of carbon nanotubes by the chemical vapor deposition of a carbon-containing gas over a metal catalyst. The reaction is heated to a temperature between 500 and 1200 °C. The especially preferred catalysts are nickel or cobalt based and the carbon-containing gas is a hydrocarbon. After the growth of the nanotubes, they are separated from the metallic catalytic particles by known methods (column 6, lines 12-19). Resasco et al. do not explicitly teach the reuse of the separated catalysts, however, it would have been obvious to one of ordinary skill at the time of invention to reuse the catalyst in order to reduce the need for expensive new catalyst material. Resasco et al. do not teach the application of a magnetic field during the growth of the nanotubes.

Xu et al. also teach a method for the production of carbon nanotubes by the chemical vapor deposition of a carbon-containing gas over a metal catalyst. The temperature ranges and preferred catalysts of Xu et al. are nearly identical to those taught by Resasco et al. Xu et al. also teach that the carbon nanofibers may be grown in the presence of a magnetic or electric field, which assists in growing straighter fibers by pulling the catalyst particles in one direction, preferably in a direction perpendicular to the growth surface (column 11, lines 40-45). Xu et al. do not explicitly teach the power of the magnetic field to be applied. However, because Xu et al. use the magnetic field for the same purpose as the applicant, it is expected that sufficient power to perform the purpose be applied. The applicant's claims of producing a magnetic field of

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several hundred gauss and of no less than one hundred gauss (claims 11-12 and 18) are thus viewed to be the optimization of a known process, held to be obvious by *In re Boesch* (205 USPQ 215) unless significantly unexpected and different results are shown.

It would have been obvious to one of ordinary skill at the time of invention to use a magnetic field, as taught by Xu et al., in the process of Resasco et al. in order to produce straighter nanotubes. Regarding claims 17-18, Official Notice is taken that single-walled carbon nanotubes have an aspect ratio of greater than two and a diameter of less than one micron.

Allowable Subject Matter

Claim 16 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Lish whose telephone number is 703-308-1772. The examiner can normally be reached on 9:00-6:00 Monday through Friday.

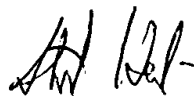
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 703-308-3837. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-305-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



PL

February 4, 2003

STUART L. HENDRICKSON
PRIMARY EXAMINER